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AUTHOR Loughlin, Anthony
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ABSTRACT

The booklet describes ways in which microprocessors can be used to improve motivation, concentration span, and performance, and reduce classroom management problems in pupils with learning and behavioral problems. Objectives and programs developed in a special school for disturbed children are reviewed for the following dedicated processors of Texas Instruments: the Little Professor (basic mathematics), Spelling ABC; Dataman (mathematical operations); Speak and Spell (letter and word recognition, spelling, vocabulary); and Speak and Maths (including basic operations, word problems and logical thinking). (CL)

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FURROWFIELD SCHOOL

PROGRAMMES FOR TEXAS INSTRUMENTS

(Anthony Loughlin)

The programmes produced at Furrowfield School have been devised under the direction and guidance of Mr. D.V. Moseley, Reader in Applied Psychology at the University of Newcastle upon Tyne, and Course Consultant to the Faculty of Educational Studies at the Open University.

The programmes may be copied and used for teaching purposes on the understanding that Mr. Moseley and the school are acknowledged. The writers would be pleased to hear of any original applications, as well as any errors and omissions in programmes presented, so that modifications can be made.

Comments and enquiries should be addressed to:

The Headteacher,
Furrowfield School,
Whitehills Drive,
Felling,
Gateshead,
Tyne & Wear, England.
NE10 9RZ

Telephone: (0632) 699499

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"The purpose of Education for all children is the same: the goals are the same. But the help that individual children need in progressing towards them will be different." (WARNOCK - D.E.S. 1978 PARA 1.4)

The intent of this booklet is to provide educators with structured programmes for inexpensive machines, which are proving efficacious and beneficial to pupils aged 6-17 who have problems in basic literacy and numeracy.

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I would like to take this opportunity of thanking David Moseley for his strong commitment and personal interest in Furrowfield School, which resulted in the development of these programmes. To my Headmaster for permission to reproduce extracts from the school ethos, and for his continuous backing; also to Gateshead Education Authority for finance and encouragement. Many refinements are due to the continuous practical help given by Mike Burleigh, a dedicated colleague, and to Kath Hayward who now operates the system.

Finally I pay tribute to the total team at Furrowfield School who strive to make it a centre of excellence by their commitment and enthusiasm.

Anthony Loughlin

(Cover and illustrations by Gordon Highmoor.)

PREFACE:

Extracts from Furrowfield School Policy Document

" Education

Furrowfield is viewed as primarily an educational resource, providing a variety of educational opportunities for a wide range of disturbed children. There is deliberate bias towards producing a traditional approach to the education of disturbed children, albeit on an individualised basis. Because some degree of formal teaching methods will be applicable, incorporating structure, discipline and control within the classroom areas, a strong academic bias will predominate. Individual programmes will provide each child with a range of objectives and stimulii, and careful monitoring of academic progress will take place to ensure that a child either marks time or regresses in any way. Outside support will be used (Schools Psychological Service, Advisory Service, University etc.) to sophisticate teaching/treatment methods, and supplement the wide range of educational materials that are already available.

Treatment

The strong academic core throughout will be seen as the primary source of therapy. Negative attitudes are more likely to be modified in the atmosphere of an industrious and stimulating classroom environment, where the supportive regime protects the more vulnerable child, and presents him with a range of alternatives to disruptive, disinterested behaviour.

Because of the spread of disorders throughout the school and the intellectual discrepancies between pupils, individual treatment techniques (i.e. behaviour modification and token reward systems) may be implemented from time to time, but generally the management and social "growth" of children will be facilitated by good standards of normal care reinforced by effective communication with caring adults.

This is not viewed as an 'experimental' institution, nor as an annexe to

those residential facilities normally provided by Social Servicer Departments. It is a unique setting with emphasis on normally acceptable standards of behaviour, and though structure plays its part in the treatment method, this is not to be confused with repression. Relationship-building is an important part of the total therapy of the school.

Curriculum Rationale

There is strong evidence of a marked relationship between maladjustment and a failure to acquire basic educational skills, especially the basic skills of reading and writing. Further to that, there is suggested from the evidence of current research, that educational retardation can lead to maladjustment.

It must suffice to know that remedial education often leads to improved adjustment in both spheres. The idea of a programme designed to suit the specific strengths and weaknesses of individual pupils has also gained strength.

The latest and most useful approach to the problem of remedial work with disturbed children is one incresingly favoured by behaviourists, since it by-passes the theoretical problem of origins. "This is the method of task analysis which breaks down the essential skills in any process to be learned, determines the pupil's position on the scale and proceeds from there," (Haring & Bateman - 1977). The school's attack is on learning difficulties, alongside, and not after treatment for emotional problems.

Diagnostic Appraisal

New referrals to Furrowfield are matched according to age, personality and predicted compatibility with a class teacher. On arrival, the child will be tested to determine his abilities in the basic skills, and highlight any educational deficits in his performance. This detailed assessment will be carried out by his class teacher, with support and guidance from the Remedial-Co-ordinator. This presents an

immediate profile of his level of functioning, which can be compared with documentation that has arrived with the child on admission.

The child can then be confronted with a suitable individual programme, which will take into account possible areas of weakness so that an appropriate remediation strategy can be introduced. Experience has indicated that most pupils on entry will need such help, and if the programme that is introduced does not remediate the problem in the short term, careful recording and monitoring of the child's progress will indicate that an alternative needs to be substituted. In this way, no child should 'mark-time' for any lengthy period, because his classroom records are visible evidence to the teacher of the success or failure of programmes that are introduced.

Remedial Programmes

As previously mentioned, class teachers have an important teaching role to fulfil in remedial work. The Remedial Co-ordinator monitors the quality and standards of remedial programmes that are introduced in each class. He will assist the teacher to diagnose problems that are evident with particular children, and prescribe the future task, the educational resources appropriate, and the teaching strategy most relevant.

Success in remediating problems is not solely attributable to suitable teaching and learning strategies, but often reflects teacher enthusiasm. "We have been compelled to the conclusion that method is more important than content: what matters is the way in which teachers generate enthusiasm and plan the programme." (Wilson and Evans - 1980)

The teacher's ability to motivate the slow-learner by the promotion of a dynamic and stimulating classroom environment, will be reflected in his personality and his constant search for further innovatory methods which complement curriculum demands.

Classroom Management

A systematic approach to individual and group management prevails. Children sit in strategic positions, engineered to ensure maximum

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supervision and learning. The teaching day is structured to ensure variety, success and eliminate stress and boredom. There is a decided emphasis towards motivating children and developing sound, working habits. Control is maintained by a combination of factors; good supervision, teacher-initiated enthusiasm, and the strategic isolation, within the classroom environment of the more disruptive elements. A strong caring thread produces relationship security for the pupils, so that they can confidently approach teaching staff and effectively communicate their learning problems. "

Working in the area of 'maladjustment', where pupils frequently present both learning and behavioural problems, I have found that the supplementary use of micro-processors with groups of low-achieving children improves motivation, concentration span and performance, with a subsequent reduction in classroom management problems.

When success was investigated, the following factors were considered to interact with the variables the children brought to the learning situation:

(a) teacher variables
(b) setting
(c) curriculum content
(d) motivation
(e) Hawthorn Effect

The teachers are interested and enthusiastic, following a united, prescribed (but agreed) approach, encouraged by the Headteacher, and able to contribute to refinements and modifications by their practical advice and criticism.

The setting created is flexible and perceived by pupils and teachers as 'special', affording the privacy of individualised presentation of instructional material, as well as the opportunity to work in pairs. In both situations there is an element of pupil responsibility, for the learning is partly self-regulated.

The structure of the programmes acts as 'advanced organisers' (Ausubel & Robinson), anchoring the ideas of the task in advance of the body of material to be learned. It is logical and understood by many pupils who can see the point of the terminal objectives, (competence in Spelling and the four rules of Number), and the relevance of the enabling objectives, i.e. passing the stages in the programmes.

The linear programmes, with practice and reinforcement loops, guarantee initial success and provide practice in fundamental skills, often absent

or only partially grasped. Record keeping and constant monitoring during the activity itself, detect stagnation quickly and remediation prevents many relapses into a failure/misbehaviour cycle.

Motivation is generated by affiliation, to please teacher, Head, auxiliaries or parents. It is generated also by enhanced ego - for nothing succeeds like success, and pupils are proud of pages of neatness, ticks and stars. However, motivation appears to be triggered primarily by the medium itself, giving impetus to the development of cognitive drives which educators have always considered it to be desirable to cultivate.

During the day pupils at Furrowfield follow a varied and stimulating educational programme, even though it is highly structured. The 'machines' are incorporated into the timetable by withdrawing pupils from their classes during the morning session at a specified time each day, for a thirty minute period. This is feasible because the individualised classroom based remedial work gives the pupil his own timetable for part of the day. Teachers structure their timetables to ensure that withdrawals make a minimal, if any, disruption to their class lessons and class teaching which balance the child's educational diet.

Though teaching machines and programmes for them do not replace the teacher, they may perform certain functions more efficiently. The machine is relatively efficient in the following respects: (a) it provides a rapid and orderly presentation of data, (b) it can provide rapid and accurate checking of responses made by the pupil, (c) it can provide adequate reinforcement and practice to assist meaningful learning. Machines are not, however, an easy option for teachers or pupils.

Micro-processors or any auto-instructional devices used in a classroom commend themselves to teachers if they keep a child on task for a period of time, as they afford teachers the opportunity to divide their attention amongst others in the group. Devices which can be readily programmed for slower learners are of particular value, as not every teacher has the requisite remedial expertise. Those who have can design new remedial programmes specifically related to other relevant areas

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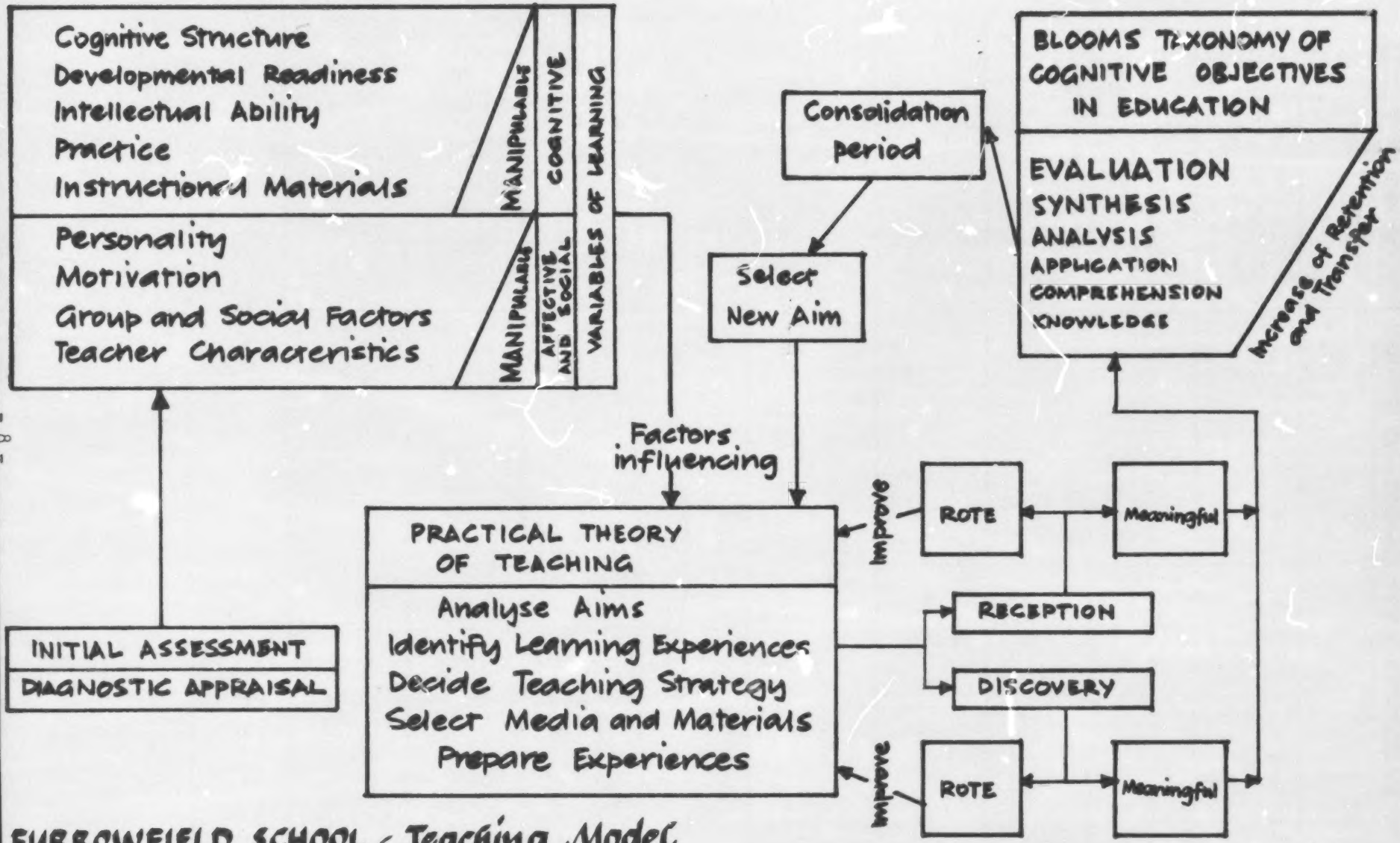
of the curriculum.

At Furrowfield programmes have been written, operated and evaluated on the following dedicated Texas Instruments:

1. Little Professor
2. Spelling ABC
3. Dataman
4. Speak and Spell
5. Speak and Maths

At present pilot work is being carried out on a calculator programme and the school has been consulted when a word list has been produced for the Anglicised version of "Speak and Spell".

It is intended to build on the pilot work and incorporate appropriate equipment which may become available.




FURROWFIELD SCHOOL - Teaching Model



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THE RELATIONSHIPS BETWEEN COMPONENTS OF THE CURRICULUM AND MICRO-ELECTRONIC ASSISTED LEARNING AT FURROWFIELD SCHOOL.

| Spelling B | SCHONELL Spelling Group & age | SCHONELL DICTATION | FURROWFIELD SPELLING LIST DERIVED FROM McNally & Murray and Edwards & Gibbon. |
|---|---|---|---|
| Level 1 | Group 1<br>Age 7 yrs | R1-10 | LIST A Group 1-5<br>LIST B Group 1-2 |
| Level 2 | Group 2<br>Age 8 yrs | R11-20 | LIST B Group 3-6<br>LIST C |
| Level 3 | Group 3<br>Age 9 yrs | R21-30 | |

| NORMAN FRANCE LEVEL ONE TWO | L/PROFESSOR | SPEAK & MATHS SOLVE IT | ARITHMETICAL PROCESSES |
|---|---|---|---|
| Line 1<br>Line 2 Line 1<br>Line 3 Line 2/3 | Level 1<br>Level 2<br>Level 3<br>Level 4 | Level 1<br>Level 2<br>Level 3 | Addition |
| Line 1<br>Line 2 Line 1<br>Line 3 Line 2 | Level 1<br>Level 2 | Level 1<br>Level 2<br>Level 2<br>Level 3 | Subtraction |
| Line 1 Line 1<br>Line 2 Line 2 | Level 3<br>Level 3<br>Level 4 | Level 1<br>Level 2<br>Level 3 | Multiplication |
| Line 1 Line 1<br>Line 2 Line 2 | Level 2<br>Level 4 | Level 1<br>Level 2<br>Level 3 | Division |

## THE LITTLE PROFESSOR PROGRAMME

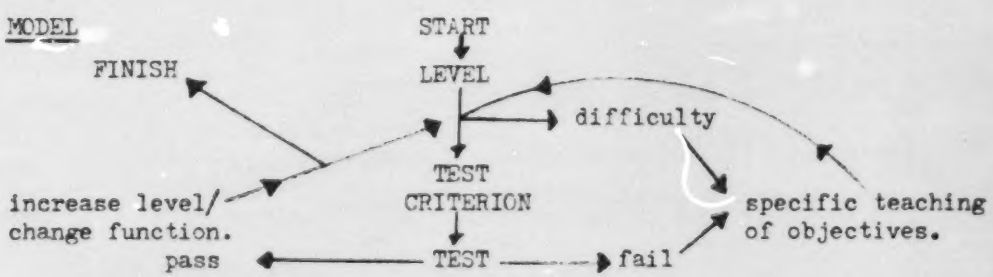
AIMS.

1. Increase and develop competence in the four basic arithmetical processes. (Addition, subtraction, multiplication and division.)

2. Improve standards of presentation in basic arithmetic.

---

A pupil begins the programme by familiarising himself (preferably under the guidance of another pupil) with the machine. He begins by selecting Addition on Level 1 and sets his book out in the stipulated manner (our examples are given.) The machine presents him with a calculation e.g. 3 + 1 = ?. He writes this vertically in his book, putting in the answer; he then enters the answer into the machine. If he is correct he gets another sum but if he is wrong the E for error is displayed and the sum is repeated. He marks his exercise book with a ✓ or x accordingly. After 10 written calculations the machine flashes up the number of sums successfully calculated. This he can record himself or show the teacher, (testing identifies cheaters), then selects another 10 additions which he does mentally and enters this score in the box at the right hand side of the page - he follows the same procedure for subtraction. He does 40 calculations daily, i.e. 200 a week. After practice, daily work can be done in 20 minutes. When he has done 50 calculations consecutively correct on a function at a particular level, he takes a timed test with the teacher, (our example is given). Here he is required to do 50 calculations at that level, mentally, under teacher supervision in a time limit. This safeguards the standard because this is a different activity to the norm; the first 10/10 is a practice one and not counted in the test. If he passes he moves on to the next level. If he fails he is required to do another 5 consecutive 10/10's correctly to achieve test eligibility. When he has got to Level 4 addition and subtraction, he begins Level 1 multiplication and division. The only deviation from this programme is at multiplication Level 4; this is the estimation game which is explained in point 3.

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Child's Exercise Book - Daily work page

| Date | | level | function | totals for mental calculations |
|---|---|---|---|---|
| | | Level 1 | + | 9/10 |
| | | Level 1 | − | 10/10 |

| | | | | | | |
|---|---|---|---|---|---|---|
| | 3 | 4 | 5 | 6 | 1 | 0 |
| | +1 | +0 | +1 | +3 | +0 | +0 |
| | 4 ✓ | 0 × | 6 ✓ | 9 ✓ | 1 ✓ | 0 ✓ |
| | | | | | | |
| | | | | | | |
| | 1 | 2 | 2 | 1 | 6 | 0 |
| 9/10 | +1 | +2 | +1 | +2 | −1 | −0 |
| | 2 ✓ | 4 ✓ | 3 ✓ | 3 ✓ | 5 ✓ | 0 ✓ |
| | | | | | | |
| | | | | | | |

| | | | | | | | |
|---|---|---|---|---|---|---|---|
| | 1 | 3 | 0 | 4 | 5 | 6 | 9 |
| | −1 | −0 | −0 | −0 | −4 | −1 | −0 |
| | 0 ✓ | 3 ✓ | 0 ✓ | 4 ✓ | 1 ✓ | 5 ✓ | 9 ✓ |
| | | | | | | | |
| | | | | | | | |

| | |
|---|---|
| | 3 |
| 10/10 | −1 |
| | 2 ✓ |
| | |
| | |

POINTS

1. At present there are two versions of this machine on the market. The differences in machine programming must be compensated for in specific teaching. All machines so far examined achieve the same level of difficulty at Level 4, but the climb to that level is angular as opposed to curved on some equipment. Machines should be identified and the programme objectives modified to those of your equipment.

2. Improved pupil performance is evident when pupils work in pairs, verbalising the problem presented for the other child to do in written form. Half-way through the activity pupils reverse roles. The language of mathematics is reinforced, (e.g. minus, subtract, the product, the sum etc), and deficiencies in the pupils' knowledge, transmission, and reception of this language can be remediated.

3. Before commencing Level 4, multiplication pupils spend 5 days completing an 'estimation game' to develop skills in this area. The estimation game involves the use of a calculator and is played in the following way:-

    1. Little Professor presents the problem which is written in column 1.
    2. The pupil guesses the answer and writes his guess in column 2.
    3. The pupil enters any digits into the machine twice until the Little Professor gives him the correct answer.
    4. The pupil enters the correct answer in column 3.
    5. Taking a calculator, the pupil subtracts his guess from the answer, or vice versa, and enters the difference in the difference column, 4.
    6. If he is 100% correct he awards himself 3 asterisks in column 5. He awards himself 2 asterisks if he is + or - 5, and if he is + or - 10 he awards himself 1 asterisk.

    He plays this game for 5 days before commencing long multiplication, so that there is a higher probability he will be able to judge the accuracy of his answer before he 'enters' it.

4. Test criteria are fixed in the programme. The timing of tests is not strictly adhered to in special cases. We suggest that Level 1 functions should be completed in 30 seconds for ten, and that 50 consecutively correct in that test situation is the pass mark.

    Flexibility in timing reflects Furneaux and Skinner's operational definition of intelligence "mental speed", and allows teachers to pass pupils taking longer, but providing evidence of mastery of the objectives involved at that level. Irrespective of their level of ability we expect pupils to progress through the system at a broadly comparable rate. The criterion for passing tests is 50 mentally consecutively correct in a time limit. Flexibility is also given when deciding the level at which testing should be in written form. This will vary with -

    a) the programming of your machine
    b) the ability of the child you are testing.

N.B. See point 5 - page

| Date | Estimation Game | | | | Level 4× Level 4÷ |
|---|---|---|---|---|---|
| | Column 1 | 2 | 3 | 4 | 5 |
| | Sum | Guess | Answer | Diff. | Stars |
| | 20 × 30 | 500 | 600 | 100 | ✓ |
| | 30 × 2 | 60 | 60 | 0 | *** |
| | 26 × 1 | 26 | 26 | 0 | *** |
| | 41 × 20 | 804 | 820 | 16 | - |
| | 12 × 12 | 152 | 144 | 8 | ** |
| | 23 × 0 | 0 | 0 | 0 | *** |
| | 13 × 2 | 26 | 26 | 0 | *** |
| | 11 × 10 | 110 | 110 | 0 | *** |
| | 19 × 30 | 500 | 570 | 70 | - |
| | 20 × 3 | 58 | 60 | 2 | ** |
| | | | | | |

5. Pupils take on average 15-20 minutes to complete their 40 daily calculations which need to be constantly monitored. There is evidence of marked pupil performance increase as a result of following this programme. Pupils make significant gains over and above those following standard teaching with textbooks. If this is the case with children deemed as having 'Special Educational Needs', and referred to Furrowfield, it may have even greater potential with children in mainstream education. It could increase the productivity of the 'average child' and motivate the slower or reluctant learner.

   Working on the machines has brought to the attention of teachers numerical abilities and manual dexterity skills that pupils had not previously been credited with. Once evident, these skills should be recorded and developed.

| Date | Test Level 1 + | Level 1 – |
|---|---|---|
| | | |
| | Practice 10/10 | Practice 10/10 |
| | | |
| | 1. 10/10 29 secs | 1. 9/10 18 secs |
| | | |
| | 2. 10/10 20 secs | 2. 10/10 23 secs |
| | | |
| | 3. 10/10 19 secs | 3. 10/10 24 secs |
| | | |
| | 4. 10/10 30 secs | 4. 9/10 19 secs |
| | | |
| | 5. 10/10 19 secs | 5. 10/10 28 secs |
| | | |
| | PASS Level 2 | REMAIN Level 1 |
| | | |
| | | |
| | | |
| | | |
| | | |
| | | |

Pupils can cheat especially as they mark their own work. The test is the safeguard of the standard. When 50 calculations are consecutively correct, a pupil is tested. The full test of 50 is carried out, even after a mistake, so performance can be fully assessed. A child may get 30 correct on his first attempt but 48 on the second. If the test is not completed this improvement cannot be seen by the child or the teacher.

## OBJECTIVES COVERED BY THE LITTLE PROFESSOR PROGRAMME LINKED TO THE NELSON/N.F.E.R. PROFILE OF MATHEMATICAL SKILLS BY DR. N. FRANCE.

"Basic numeracy is the ability to use a four function electronic calculator sensibly" (Girling in PME 233 Unit 1 O.U. Mathematics across the curriculum). Calculator competence is a fundamental component of basic numeracy at Furrowfield. The objectives below indicate social-competence levels of computation and calculator competence standards at Furrowfield School. Calculator competence is the ability to function at objectives Addition 21, Subtraction 16, Multiplication 17, Division 16, and to recall tables to 12 presented randomly. To retain a calculator a pupil must pass criterion referenced tests in these objectives, without a calculator at half-termly intervals.

1. These objectives form the basis of the Furrowfield School Maths Test.
2. It is recognised that these objectives do not deal with decimals. Calculator competence levels in this document are for the 'award of use' of these aids only. Decimals should be taught in parallel with these objectives.

| | ADDITION | | OBJECTIVES |
|---|---|---|---|
| | N. France | | A1 Add single digit numbers including zero with sums less than |
| Level | 1 | 2 | 10, vertically. |
| | | | A2-A1 in equation form. |
| | | | A3-A1 and A2 mentally. |
| | | | A4- Add single digit numbers with sums of 10, vertically. |
| | Line 1 | | A5-A4 in equation form. |
| | | | A6- Add A4 and A5 mentally. |
| | | | LITTLE PROFESSOR LEVEL ONE. |
| | | | A7 - Add 1 or 2 digit numbers with sums less than 20; no carrying, vertically. |
| | | | A8-A7 equation form. |
| | | | A9-A7 and A8 mentally. |
| | | | A10- Add 1 or 2 digit numbers with sums less than 20; including carrying, vertically. |
| | Line 2 | Line 1 | A11-A10 in equation form. |
| | | | A12- Add A10 and A11 mentally. |
| | Line 3 | Line2/3 | A13- Add 2 2-digit with sums of less than 100; no carrying, vertically. |
| | | | A14- Add A13 mentally. |
| | | | A15- Add 2 2-digit numbers with sums less than 100; including carrying, vertically. |
| | | | A16- Add A15 mentally (or equation form also if applicable) |
| | | | LITTLE PROFESSOR LEVEL TWO |
| | | | A17- Add 2 2-digit numbers including carrying to hundreds column. |

LITTLE PROFESSOR LEVEL THREE AND FOUR

A18- Add 4 2-digit numbers including carrying to hundreds column.
A19- Add HTU to HTU including carrying to thousands column.

SOCIAL COMPETENCE LEVEL

A20- Add THTU including carrying
A21- Add 4-THTU to THTU including carrying.

CALCULATOR COMPETENCE LEVEL

SUBTRACTION

Line 1

S1- Subtract units from units, including zero, vertical form.
S2- Subtract S1 equation form.
S3- Subtract S1 and S2 mentally.

LITTLE PROFESSOR LEVEL ONE

S4- Subtract 1 digit from a 2-digit number; no carrying, vertically.
S5- S4 equation form.
S6- Subtract S4 and S5 mentally.

Line 2 Line 1

S7- Subtract a 1-digit number from a two-digit number including carrying, vertically.
S8- Subtract S7 mentally (Equation form if applicable)
S9- Subtract 2 2-digit numbers in written form; no carrying.
S10- Subtract S9 mentally.

Line 3

S11- Subtract 2 2-digit numbers in written form with carrying.
S12- Subtract S11 mentally (if applicable)

LITTLE PROFESSOR LEVELS TWO, THREE AND FOUR

S13- Subtract 2-digit numbers from 2-digit numbers including zero, in written form, no carrying.
S14- Subtract S13 including carrying.
S15- Subtract HTU from HTU including carrying
S16- Subtract HTU from THTU including carrying.

SOCIAL COMPETENCE LEVEL

S17- Subtract 4-figure numbers from 5 figure numbers including zero, and carrying.
S18- Subtract 5-figure numbers from 6-figure numbers including zero, and carrying.

CALCULATOR COMPETENCE LEVEL

MULTIPLICATION

M1- Multiply numbers 0-5 by numbers 0-5 to give answers with a maximum of 9 in vertical form.
M2- Multiply M1 in equation form.
M3- Multiply M1 and M2 mentally.

LITTLE PROFESSOR LEVEL ONE

M4- Multiply by units to give answers below 25, in vertical form.
M5- Multiply M4 in equation form.
M6- Multiply M4 and M5 mentally.

24

LITTLE PROFESSOR LEVEL TWO

M7- Multiply by units to give answers below 100, vertical form.
M8 - Multiply M7 in equation form.
M9 - Multiply M7 and M8 mentally.
M10 - Multiply TU by U to give answers below 100 in written form.
Line 1 | Line 1 M11 - Multiply TU by U including carrying to give answers below 100 in written form.

LITTLE PROFESSOR LEVEL THREE

M12 - Multiply TU by U including carrying to hundreds column.
Line 2 | Line 2 M13 - Multiply TU by TU including carrying to hundreds column.

LITTLE PROFESSOR LEVEL FOUR/SOCIAL COMPETENCE LEVEL

M14 - Multiply HTU by U including zero, and carrying to THTU.
M15 - Multiply HTU by TU including zero, and carrying to THTU.
M16 - Multiply HTU by HTU including zero, and carrying.
M17 - Multiply THTU by THTU including carrying.

CALCULATOR COMPETENCE LEVEL

DIVISION

D1 - Divide units by 0-3, no remainders, in written form.
D2 - Divide D1 mentally.

LITTLE PROFESSOR LEVEL ONE

D3 - Divide 1 or 2 digit dividends by 0-5, no remainders, in written form.
Line 1 | Line 1 D4 - Divide D3 mentally.

LITTLE PROFESSOR LEVEL TWO

D5 - Divide 2 digit dividends by 0-9 without remainders in written form.

D6 - Divide D5 mentally

LITTLE PROFESSOR LEVEL THREE

D7 - Divide dividends up to 99 by 0 - 9 without remainders in written form.

D8 - Divide D7 mentally.

LITTLE PROFESSOR LEVEL FOUR

D9 - Divide 2 digit numbers, including remainders in written form.
D10 - Divide D9 mentally
Line 2 | Line 2 D11 - Divide 3 digit numbers by units, including remainders in written form.
D12 - Divide 4 digit numbers by units, including remainders in written form.

SOCIAL COMPETENCE LEVEL

D13 - Divide 5 digit numbers by units, including remainders in written form.
D14 - Divide TU by TU includings remainders in written form.

SOCIAL COMPETENCE LEVEL (CONTD)

D15 - Divide HTU by TU including zeros and remainders in written form.

D16 - Divide THTU by TU including zeros and remainders in written form.

## THE SPELLING B PROGRAMME

This programme incorporates the functions of the dedicated Texas Instrument "Spelling B", and links it to the English Colour Code, devised by Moseley, and to lists supplied in "A Classroom Index of Phonic Resources" (see recommended books) and the Jackson Phonic Tests.

OBJECTIVE: To improve pupil performance in Spelling.

PROGRAMME OUTLINE:

A child has the machine and his exercise book which is set out in a specified way, (examples given). He begins by working with 'Starts With'. A number appears in the display (e.g. 8); next to that number is a picture (doll). The child presses the letter on the keyboard that number 8 starts with (D). After he has done five of these, the machine gives him a score out of five, which he can record himself or show the teacher. (Testing identifies cheating.) When he has four consecutive 5/5 scores, he takes a test and goes onto the next stage of the programme. If he fails he must go back and achieve test eligibility (four consecutive 5/5 scores.) Testing is by using Jackson Phonic Skills Tests as Spelling tests, and if they are failed more than twice, screen a pupil on word lists from "A Classroom Index of Phonic Resources," or the Colour Code Word List.

A pupil works on the machine daily for approximately ten minutes.

SPELLING B STAGES:

1. STARTS WITH LEVEL ONE - The child must input the initial letter of a word, given by the machine which displays a number corresponding to a picture in an accompanying booklet. He enters the numbers the machine gives him in the number given column and his score in the score column. He works individually until he attains Test eligibility, (four consecutive 5/5 scores).
   TEST JACKSON PS TEST 1, CRITERION 24/25 (Allow also b/d reversals).

2. THREE LETTER SCRAMBLES A teacher, or preferably another pupil, inputs five 3 letter words from the machine word list into the machine, and writes the number in the Number Given column, (takes two minutes). The machine then

presents these to the child in a scrambled (re-arranged) form. The machine presents one jumbled word at a time and the pupil arranges it in the correct order (word reversals have to be avoided; e.g. dog/god, pot/top). He enters his score in the Score Column; four consecutive 5/5 scores.

TEST JACKSON PS TEST 5 as a spelling test. The criterion for passing the test is 30/35. (Fail .... attain test eligibility again.) If there is repeated failure, select words from the Colour Code wordlist of the Phonic Resources book.

3. FOUR LETTER SCRAMBLES — (As set out work in THREE LETTER SCRAMBLES) Four consecutive 5/5 scores.

TEST JACKSON PS TEST 6 as a spelling test; pass 30/35. Fail...attain test eligibility again. If there is repeated failure, select words from the Colour Code of the Phonic Resources book.

4. MISSING LETTER LEVEL ONE — The machine selects a word from Level One and reproduces it in part, (e.g. b_t), and the pupil must input the missing letters. In this case he is allowed to make five errors before he is penalised. When ten words are consecutively correct he moves on to Stage 5.

5. SPELLING LEVEL ONE — The machine selects a number corresponding to a picture from the level one word list and the pupil must spell the total word with no assistance. When five consecutive 5/5 scores are achieved, he moves on to stage 6.

6. MYSTERY WORD LEVEL ONE — The machine displays a 'hang-man' indication of word length, for a word selected from level one. The mystery word must be solved in eight attempts or less. The pupil writes the word down in the

'Number Given' column and marks it with a tick or a cross in the 'Score Column'.
When ten words are consecutively correct, he moves on to Stage 7.

7. SCRAMBLES LEVEL TWO — Scramble the first five words from the printed level two list; (remove the picture booklet to deter cheating). Scrap paper is provided and the numbers of the words selected are entered in the pupil's exercise book. Once given the machine, the pupil must unscramble the presented words and enter his score in the score column. When four consecutive 5/5 scores are obtained, move on to Stage 8.

8. MISSING LETTER LEVEL TWO — Until ten words are consecutively correct.

9. SPELLING LEVEL TWO — Until five consecutive 5/5 scores are achieved.

10. MYSTERY WORD LEVEL TWO — Until ten words are consecutively correct.

11. SCRAMBLES LEVEL THREE — Words are selected from the level three word list following the procedure for level two scrambles. When four consecutive 5/5 scores are achieved, move on to Stage 12.

12. MISSING LETTER LEVEL THREE — When ten words are consecutively correct, move on to Stage 13.

13. SPELLING LEVEL THREE — Work until five consecutive 5/5 scores are achieved then move on to Stage 14.

14. MYSTERY WORD LEVEL THREE — Work until ten words are consecutively correct.

N.B. Strict monitoring, particularly with scrambles is advised. Employ a method where inspection of books occurs before pupils are permitted to move on to the next stage, and in some cases demand proof of competence, which in the

| Date | Numbers | Score |
|---|---|---|
| Starts with | | |
| 20·11·81 | 5 6 7 8 9 | 5/5 ✓ |
| | 10 11 12 13 14 | 5/5 ✓ AL |
| | | |
| 21·11·81 | 81 82 83 84 85 | 5/5 ✓ |
| | 14 15 16 17 18 | 5/5 ✓ AL |
| TEST | | |
| PS 3 | PASSED —— | Teachers Signature |
| | | |
| 3 letter | | |
| Scrambles | | |
| 22·11·81 | 50 51 52 53 54 | 4/5 AL |
| | 6 7 8 9 10 | 5/5 |
| | | |
| 23·11·81 | 11 12 13 14 15 | 5/5 |
| | 16 17 18 19 20 | 5/5 |
| | Machine numbers for "Scrambles" are entered and | Scores are entered or ticks and crosses |
| | the words presented in 'Mystery Word' and 'Missing | |
| | Letter' | |
| | | |

Teachers initials are included when book is inspected for neatness or monitoring standards

This daily activity takes 8 minutes maximum, usually it takes 5 minutes.

majority of cases is readily given. A preliminary evaluation in July 1981 by D.V. Moseley, showed gains in spelling age of three months per calendar month when following the programme, but when a later evaluation was conducted in September 1981, the mean increase was shown to be one and a half months per calendar month. There had been a falling off of skills during the summer vacation however.

However, a recent analysis of our pupil performance over a twelve month period (Moseley 1982), shows that:

1) The average rate of progress, (Spelling Age), is two months per calendar month of machine use.
2) The average output of work produced by pupils (measured by examining daily written work and weekly creative writing), was 162 words in 1979-1980, and in 1980-1981 the average was 344 words.

## DATAMAN PROGRAMME

A hierarchy of the useful functions that Dataman provides with structured programmes to capitalise on them.

1. Teaches tables in sequence to times 9.
2. Provides work on the 4 rules at two levels of difficulty.
3. Provides the facility for pupil-programming up to 5 items in the 4 rules of number.
4. Provides the teacher with a class game of simple addition, similar to musical chairs.
5. Provides an individual game to reinforce place value and numbers between 9 and 100, with potential for reinforcing the concept of $\frac{1}{2}$.
6. Provides an individual game to play which reinforces early work on subtraction. Low educational-potential activity.

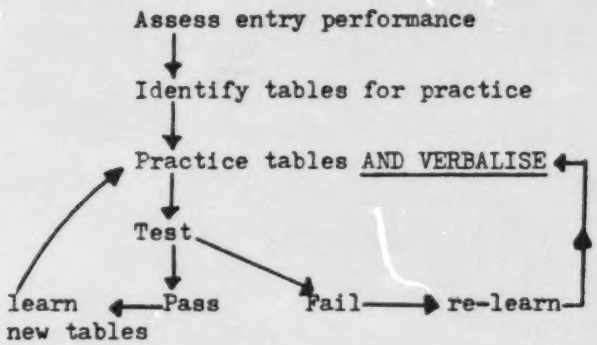
### DATAMAN

Many pupils at Furrowfield find it hard to think of themselves as pupils who don't find it hard to learn their tables.

### OBJECTIVE

1. Recall table facts presented randomly from tables 1-9

### MODEL




### POINTS

1. Timing using the machine, is used only for motivation.
2. There is a considerable reduction in pupil performance on table facts after a vacation. Provision should be made during the first week of term for revision.
3. It has been found that children who do not verbalise the table facts presented on the machine, have a slower rate of progress through the programme; and their long term retention is poorer.

### MULTIPLICATION OBJECTIVES

DM 1 Recall tables X1 presented randomly.
DM 2 Recall tables X2 presented randomly.
DM 3 Recall tables X3 presented randomly.
DM 4 Recall tables X4 presented randomly.
DM 5 Recall tables X5 presented randomly.
DM 6 Recall tables X6 presented randomly.
DM 7 Recall tables X7 presented randomly.
DM 8 Recall tables X8 presented randomly.
DM 9 Recall tables X9 presented randomly.

| Date | Tables x 3 | |
|---|---|---|
| Day 1 | 1 x 3 = 3 | 7 x 3 = 21 |
| * Start week by setting out top half of page thus for table to be learned | 2 x 3 = 6 | 8 x 3 = 24 |
| | 3 x 3 = 9 | 9 x 3 = 27 |
| | 4 x 3 = 12 | 10 x 3 = 30 |
| | 5 x 3 = 15 | 11 x 3 = 33 |
| | 6 x 3 = 18 | 12 x 3 = 36 |
| | | |
| | 3 6 9 12 15 18 21 24 27 30 33 36 | |

| | |
|---|---|
| | |
| Date | |
| Day 2 | 10 / 10 / 10 |
| 3 | 10 / 10 / 10 |
| 4 | 10 / 10 / 10 |
| 5 | 10 / 10 / 10 |
| | score |
| | number set |
| | time in atom seconds (time is used for motivation) |
| | |
| | |
| | |
| | |
| | |

N.B. Very simple number bond work with units can also be done with young pupils using ELECTROFLASH on addition subtraction and division.

The Electroflash game presents the following objectives in sequence, but we have found it more profitable to test random as opposed to sequenced recall of tables. Test the pupils by asking them the even tables in a table selected, e.g. 2x2 = ? 4x2 = ? and then the odd tables e.g. 1x2 = ? 3x2 = ?. Where they make one mistake, set that dataman objective - in our case DM 2. Set out the child's book as shown or get him to copy it from a master copy on the wall. He then takes the machine, presses ON, ELECTROFLASH, TIMES 2 and GO. He enters his score as shown and does this 4 times daily. This takes about 4-5 minutes. He repeats the daily 4 for a week and is tested (as he was originally) on the following Monday. If he passes he moves on to DM 3. If he fails he repeats it for another week. If he says it correctly check his retention on DM 2 and 3. It is advisable to begin daily work on DM 2 and work up to the table to be learned.

4 Rules of Arithmetic. (Presented in 3 variations)

a - to input the answer 4 + 3 = (?)
b - to input the second component to a statement 3 + (?) = 9
c - to input the first component of a statement (?) + 4 = 10

This order is the result of establishing the levels of difficulty involved in the task.

This work is best set out with the objective listed in the margin after the date and the scores to the right of the margin. Employ a system where you initial the book before moving on and give random 'security' checks - see layout page.

| ADDITION | | OBJECTIVES |
|---|---|---|
| N.France | | |
| 1 | 2 | DM10 - Level 1 Position 1.Add units to units<br>5 consecutive 10/10 scores |
| | | DM11 - Level 1 Position 2.Input the second component of a statement involving addition of units.<br>5 consecutive 10/10 scores |
| | | DM12 - Level 1 Position 3.Input the first component of a statement involving addition of units. 5 consecutive 10/10 scores. |
| | | DM13 - Level 2 Position 1.Add TU to TU. 5 consecutive 10/10 scores. |
| | | DM14 - Level 2 Position 2.Input the second component of a statement involving addition of TU. |
| | | DM15 - Level 2 Position 3.Input the first component of a statement involving addition of TU.<br>5 consecutive 10/10 scores. |
| Line 3 | Line 2/3 | DM16 - Level 2 TEST 20 correct with teacher. |
| SUBTRACTION | | DM16 - Level 1 Position 1. Subtract U from TU.<br>5 consecutive 10/10 scores |
| | | DM17 - Level 1 Position 2.Input the second component to a statement involving the subtraction of U from TU.<br>5 consecutive 10/10 scores. |
| | | DM18 - Level 1 Position 3.Input the first component to a statement involving the subtraction of U from TU.<br>5 consecutive 10/10 scores. |
| | | DM19 - Level 2 Position 1.Subtract TU from TU<br>5 consecutive 10/10 scores. |
| | | DM20 - Level 2 Position 2.Input the second component to a statement involving subtraction of TU from TU.<br>5 consecutive 10/10 scores. |
| | | DM21 - Level 2 Position 3. Input the first component to a statement involving the subtraction of TU from TU |
| Line 2 | Line 1 | DM22 - Level 2 TEST 20 correct with teacher. |
| MULTIPLICATION | | |
| | | DM23 - Level 1 Position 1. Multiply U by U.<br>5 consecutive 10/10 scores. |
| | | DM24 - Level 1 Position 2. Input the second component to a statement involving multiplication of units. |
| | | DM25 - Level 1 Position 3. Input the first component to a statement involving the multiplication of units.<br>5 consecutive 10/10 scores. |

| Date | score | number set | time | |
|---|---|---|---|---|
| | | | | |
| DM 16 | 10 | 10 | 3 | |
| behavioral | 10 | 10 | 8 | |
| objective | 10 | 10 | 5 | |
| | 10 | 10 | 3 | |
| | 10 | 10 | 4 | Checked & Tested |
| | | | | |
| | Move on to DM 17 Teachers Signature | | | |
| | | | | |
| | | | | |
| Date | | | | |
| | | | | |
| DM 17 | 4 | 10 | 26 | |
| | 8 | 10 | 13 | |
| | 8 | 10 | 10 | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |
| | | | | |

| | | |
|---|---|---|
| | | DM 26 - Level 2 Position 1. Multiply U by U<br>5 consecutive 10/10 scores. |
| | | DM 27 - Level 2 Position 2. Input the second component to a statement involving the multiplication of units.<br>5 consecutive 10/10 scores. |
| | | DM 28 - Level 2 Position 3. Input the first component to a statement involving the multiplication of units |
| | | DM 29 - TEST 20 correct with teacher. |

DIVISION (no remainders)

| | | |
|---|---|---|
| | | DM 30 - Level 1 Position 1. Divide TU by U (no remainder)<br>5 consecutive 10/10 scores. |
| | | DM 31 - Level 1 Position 2. Input the second component to a statement involving the division of TU by U.<br>5 consecutive 10/10 scores. |
| | | DM 32 - Level 1 Position 3. Input the first component to a statement involving the division of TU by U.<br>5 consecutive 10/10 scores. |
| | | DM 33 - Level 2 Position 1. Divide TU by U.<br>5 consecutive 10/10 scores. |
| | | DM 34 - Level 2 Position 2. Input the second component to a statement involving the division of TU by U.<br>5 consecutive 10/10 scores. |
| | | DM 35 - Level 2 Position 3. Input the first component to a statement involving the division of TU by U. |
| Line 1 | Line 1 | DM 36 - Level 2 TEST 20 correct with teacher. |

WIPE OUT

Motivate and improve pupil performance on the addition of units.

DM 37 - 10 games played.
DM 38 - 20 games played.
DM 39 - 30 games played.

NUMBER GUESSER

Reinforce work with place value to HTU and develop the concept of a half.

DM 40 - 10 games played.
DM 41 - 20 games played.
DM 42 - 30 games played.

PUPIL PROGRAMMING Pupil A inputs 5 sums for pupil B and times him.
Use this facility as you think necessary or desirable.
The Programme Ceilings are as follows.

| | | |
|---|---|---|
| Line 3 | Line 2/3 | Addition - TU to TU |
| Line 3 | Line 1 | Subtraction - TU from TU |
| Line 1 | Line 1 | Multiplication TU by U |
| Line 1 | Line 1 | Division TU by U .....INCLUDING REMAINDERS! |

## THE SPEAK AND SPELL PROGRAMME

Vocabulary 236 words in 4 levels.
The Jackson Phonic Level Rating of these words is approximate.

**PROGRAMME**

Method: The child writes the date and the stage in the left hand side of the margin and his score at the right hand side. Employ a system where you initial the book before allowing a child to move on and give random checks to safeguard the standard.

SS 1. Recognition of capital letter names. (Jackson PS Level 2)

SS 2. Match letter and letter name to keyboard location.
Letter sayer (???)
25 correct consecutively.
Test PS Test 2.

SS 3. SAY IT A 54 words Phonic Skills level range 5 - 10
Mode phonic level 6.
5 consecutive scores of 9 or more - (to allow for pronunciation).

SS 4. SPELL A On/Go
5 consecutive scores of 9 or more.

SS 5. SAY IT B 54 words Phonic Skills Level range 5 - 10
Mode phonic level 9
5 consecutive scores of 9 or more.

SS 6. SPELL B On/go
5 consecutive scores of 9 or more.

SS 7. SAY IT C 64 words Phonic Skills Level range 9 - 11
Mode Phonic Level 10.

SS 8. SPELL C On/go
5 consecutive scores of 9 or more.

SS 9. SAY IT D 64 words Phonic Skill Level range 9 - 11
Mode Phonic Level 11.

SS 10. SPELL D
5 consecutive scores of 9 or more.

SS 11. MYSTERY WORD
Complete 50 words on this game.
Reinforces vowel work, the y rulee if not vowel is present, and children recognise the frequency of the letters e, r and h, in the 'beat the machine' strategy.

At present this machine is used after Spelling ABC, as we have graded the work loads. Success on Spelling B Level 3, leads to instant success on Speak and Spell, and builds enthusiasm before encountering more advanced modules. It is also a motivator. It provides practice and reinforcement in the words limited by its 236 word vocabulary. It teaches the spelling of a word if a child incorrectly inputs the word on two consecutive occasions.

The problem of speech is partially overcome by (a) familiarity with the machine and voice, (b) the structure of the programme, (c) the adaptability of the pupils to 'tune in' to the voice rapidly, and (d) the test criteria. If teachers wish, they can make a template and attach it to the Speak and Spell with clear, stick-backed plastic, transforming the upper case touch display to lower case.

SUPER STUMPERS. (A MODULE FOR SPEAK AND SPELL)

Vocabulary 125 words. Level A contains the mis-spellings of 50% of primary school children, Level B by 60%, Level C by 70% and Level D by 80%.

Ensure that word length is frequently more than 5 letters on "Say it A" to check that the module is operating. To stop a "Say it" sequence, press 'ON'.

Initial all pupils' books before allowing them to move on a stage.

OBJECTIVES

1) Accurately spell more than 90% of the machine vocabulary.
2) Reinforce pupils' ability to identify the tense of a sentence.
3) Establish/maintain pupils' handwriting to agreed standards.

---

METHOD

The child enters the date in the margin, and below the date the stage number of the programme (e.g. MSS 3). He then executes the machine instructions for the activity 'Say it A'. He enters his score to the right of the margin.

| | | |
|---|---|---|
| e.g. | DATE | |
| | MSS I | 9 correct 1 wrong |
| | DATE | 3 correct 7 wrong |
| | DATE | 7 correct 3 wrong |

When he has four consecutive scores of 9 or more, he moves on to 'Spell A'. When presented with the first word the child enters (1) in the margin and writes a sentence employing that precise word and underlines it. When he has written the sentence he should indicate

| | | |
|---|---|---|
| e.g. | DATE | |
| | FUTURE 1) | Tom will go <u>swimming</u> next week. |
| | PAST 2) | Tom broke his <u>wrist</u> yesterday. |

the sentence tense in the margin (PAST, PRESENT, FUTURE), then enter the spelling into the machine. (If he forgets the word the machine will repeat it). When ten sentences are completed the book should be marked by the supervisor and corrections completed before the machine can be used again. Pupils should not be allowed to repeat the same sentence if words recur. Marking is ideally a tutorial situation and should be done as soon as the activity is completed.

| STAGE | | |
|---|---|---|
| MSS 1 | Say it A | 4 consecutive scores of 9 or more |
| MSS 2 | Spell A | " |
| MSS 3 | Say it B | " |
| MSS 4 | Spell B | " |
| MSS 5 | Say it C | " |
| MSS 6 | Spell C | " |
| MSS 7 | Say it D | " |
| MSS 8 | Spell D | " |

## MIGHTY VERBS
## (A MODULE FOR SPEAK AND SPELL)

**Vocabulary:** Thirty verbs in four forms. (120 Words)

**Objectives:**

1. Accurately spell 90% of machine vocabulary.
2. Reinforce pupil's ability to discriminate between the past, present and future tense.
3. Indicate the overlap between the plural of a verb and the present tense.
4. Add or remove an 'e' before modifying verbs on level B into the present tense.
5. Modify verbs on Level C into the past or present tense.
6. Establish/maintain pupil's handwriting to agreed standards.

**Methods:** Follow the same procedure as for 'Super Stumpers' but specifically test objective 4 and 5.

| Stage | | |
|---|---|---|
| MMV 1 | Say it A | four consecutive scores of 9 or more |
| MMV 2 | Spell A | " |
| MMV 3 | Say it B | " |
| MMV 4 | Spell B | " |
| | TEST OBJECTIVE 4: | ask pupil to spell columns ending in 'ed' and 'ing'; pass mark 8 or more. |
| MMV 5 | Say it C | four consecutive scores of 9 or more |
| MMV 6 | Spell C | " |
| | TEST OBJECTIVE 5: | ask pupil to spell columns ending in 'ed' and 'ing'; pass mark 12 or more |
| MMV 7 | Say it D | |
| MMV 8 | Spell D | |

MAGNIFICENT MODIFIERS (A MODULE FOR SPEAK AND SPELL)

Vocabulary 133 adjectives arranged in 4 levels.

Ensure that the module is operating by checking that words are frequently longer than 5 letters on "Say it A". To stop the "Say it" sequence, press "on".

Method is identical to Super Stumpers following the stages below.

Objectives

1) Accurately spell 90% of the machine vocabulary.
2) Reinforce pupils' ability to discriminate between the past, present, and future tense.
3) Arrange adjectives in level C in order of magnitude.
4) Establish/maintain handwriting to agreed standards.

---

STAGE

| | | | |
|---|---|---|---|
| MMM 1 | Say it | A | 4 consecutive scores of 9 or more |
| MMM 2 | Spell | A | " |
| MMM 3 | Say it | B | " |
| MMM 4 | Spell | B | " |
| MMM 5 | Say it | C | " |
| MMM 6 | Spell | C | " |

TEST - pupils to arrange 40 cards containing the words from Level C in 3 columns from left to right as in the example.

| | | | |
|---|---|---|---|
| e.g. | small | smaller | smallest |
| | big | bigger | biggest |

| | | |
|---|---|---|
| MMM 7 | Say it | D |
| MMM 8 | Spell | D |

HOMONYM HEROES (A Module for "Speak and Spell")

Vocabulary: 98 words arranged in four levels.

Objective: Select from presented homonyms the correct word to complete a sentence.

---

Method: Test a pupil on List A from the form 1 supplied on the following page. If it is passed, test him on List B, etc. Begin pupils on the programme at their level of competence. Pupils only follow machine instruction and do not write sentences in this module programme. Recording is done in the same manner as 'Super Strumpers'.

e.g.

| Date | | |
|---|---|---|
| MHH3 | 9 correct | 1 wrong |
| Date | 8 correct | 2 wrong |

Design parallel forms for pupils needing three or more tests, otherwise a practice effect may account for a pass mark.

| STAGE | | |
|---|---|---|
| MHH 1 | Say it A | four consecutive scores of 9 or more |
| MHH 2 | Spell A | |
| | TEST A | Pass mark 15 or more |
| MHH 3 | Say it B | |
| MHH 4 | Spell B | |
| | TEST B | Pass mark 14 or more |
| MHH 5 | Say it C | |
| MHH 6 | Spell C | |
| | TEST | Pass mark 21 or more (due to Americanisms) |
| MHH 7 | Say it D | |
| MHH 8 | Spell D | |
| | TEST | Pass mark 15 or more (due to Americanisms) |

## HOMONYM HERO[illegible] TEST

**TEST** Make spirit duplicator sheets containing the following sentences for pupils to insert the correct word.

**OBJECTIVE**

Select from presented homonyms the correct word to complete the sentence.

| | | |
|---|---|---|
| LEVEL A | 1) Ben was the ..... pirate. | blew blue |
| | 2) The wind ..... and the ship moved on. | blew blue |
| | 3) The grass was wet with ..... | dew due do |
| | 4) What shall we .....? | due do dew |
| | 5) When is the bus .....? | do due dew |
| | 6) I have ..... pound left. | one won |
| | 7) It is act three, ..... six in the play. | seen scene |
| | 8) I have not .....the football this week. | seen scene |
| | 9) Mother and .....went for a walk. | sun son |
| | 10) Fred did not ..... the money. | steal steel |
| | 11) The ship was made of ..... | steal steel |
| | 12) The ..... did not shine all day. | son sun |
| | 13) The cat had no ..... | tail tale |
| | 14) Peter told a fairy ..... | tail tale |
| | 15) John and Tom lost .....dog. | their they're |
| | 16) Alan and Paul,.....sick of the weather. | their they're |
| | 17) ".....not my fault," said Tom. | its it's |
| | 18) I pinched ..... nose and it yelped. | its it's |
| | 19) Tim ..... the race. | one won |
| | 20) Knock on ..... for luck. | wood would |
| | 21) ..... you like to go out to play? | would wood |

PASS MARK - 16 or more

---

| | | |
|---|---|---|
| LEVEL B | 1) The car stopped when Tim hit the ..... | break brake |
| | 2) "The window might .....," said Tom. | break brake |
| | 3) I know the ..... of the week. | day's days daze |
| | 4) I have done a hard ..... work. | daze days day's |
| | 5) I was in a .....from a bump on the head. | daze days day's |
| | 6) I did not think that my cat would..... | dye die |
| | 7) I will ..... my jumper green. | dye die |
| | 8) I have a book on .....from the library. | loan lone |
| | 9) The .....man rode by, he was a ranger. | loan lone |
| | 10) The postman delivers the ..... | mail male |

| | | | |
|---|---|---|---|
| 11) | I have a ..... cat, he is called Tom. | mail | male |
| 12) | I like milk and..... chocolate. | plain | plane |
| 13) | The .....was noisy on take-off. | plain | plane |
| 14) | The dress gave way at the ..... | seems | seams |
| 15) | It ..... rather strange here. | seems | seams |
| 16) | The ..... is coming in. | tide | tied |
| 17) | The horse is .....to the post. | tide | tied |
| 18) | The fat lady had a large ..... line. | waist | waste |
| 19) | The ..... paper basket was full. | waist | waste |

PASS MARK - 14 or more

---

| | | | | | |
|---|---|---|---|---|---|
| LEVEL C | 1) | The man had no .....and could not breathe | air | hair | heir |
| | 2) | The man had to .....the water out. | bail | bale | |
| | 3) | The prisoner was refused ..... | bale | bail | |
| | 4) | The music had a good ..... | beet | beat | |
| | 5) | Sugar comes from sugar ..... | beet | beat | |
| | 6) | My mother bakes ..... | bread | bred | |
| | 7) | My dad .....rabbits for money. | bread | bred | |
| | 8) | I do not like ..... | ewe | you | |
| | 9) | The female sheep is called a ..... | ewe | you | |
| | 10) | A bald man has no ..... | heir | hair | hare |
| | 11) | The .....was in the field. | heir | hair | hare |
| | 12) | The election .....was wrong. | pole | poll | |
| | 13) | The North ..... is a cold place. | pole | poll | |
| | 14) | It will not .....said John. | rein | rain | |
| | 15) | "Hold the .....", said the horseman. | rein | rain | |
| | 16) | Turn ..... said the examiner. | rite | right | wright |
| | 17) | The marriage ..... was performed. | rite | right | wright |
| | 18) | Have a bread ..... | role | roll | |
| | 19) | The star had the main ..... in the play. | role | roll | |
| | 20) | Do not .....at me, said the man. | stair | stare | |
| | 21) | Tom tripped on the ..... | stair | stare | |
| | 22) | Dracula was killed with a ..... | steak | stake | |
| | 23) | The cook produced a rump ..... | steak | stake | |
| | 24) | The blood oozed from a ..... | vane | vein | |
| | 25) | A weather cock is sometimes called a ..... | vane | vein | |
| | 26) | I must ..... a letter. | write | right | rite |
| | 27) | An egg ..... is yellow. | yolk | yoke | |
| | 28) | The .....of your shirt is at your neck and shoulders. | yolk | yoke | |

PASS MARK - 21 or more

| | | |
|---|---|---|
| LEVEL D 1) | Lady Diana walked up the ..... | isle aisle I'll |
| 2) | The .....is surrounded by water. | isle aisle I'll |
| 3) | I am not ..... in the pond. | allowed aloud |
| 4) | The man spoke ..... | allowed aloud |
| 5) | .....the turkey, said Pat. | baste based |
| 6) | The ship is ..... in Plymouth. | baste based |
| 7) | The wild .....ran off to hide. | boar bore |
| 8) | "Alan is a ....," said Robert. | boar bore |
| 9) | "Play the guitar,.....G", said Tom. | cord chord cored |
| 10) | The bathroom light works by a ..... | chord cord cored |
| 11) | The blind have no ..... | cite sight site |
| 12) | "I shall .....the newspaper," said Fred. | cite sight |
| 13) | Fred .....the apple. | chord cored cord |
| 14) | The man was .....to the poor dog. | cruel crewel |
| 15) | The tapestry was made from ..... | crewel cruel |
| 16) | The Greek .....was valuable. | earn urn |
| 17) | I do not .....much money. | earn urn |
| 18) | ".....not go," said Fred. | I'll isle aisle |
| 19) | The building .....is dangerous. | site sight site |
| 20) | "Have a ....," said Tom, chewing hard. | suite sweet |
| 21) | I bought a .....at the sale. | suite sweet |

PASS MARK - 15 or more.

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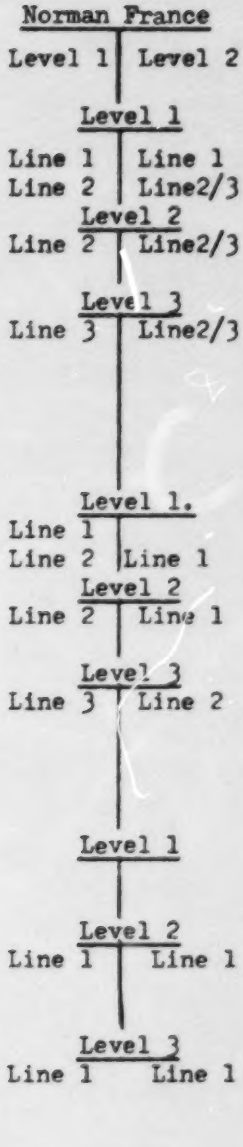
## THE SPEAK AND MATHS PROGRAMME

### DIAGNOSTIC APPRAISAL

Before commencing this programme, unnecessary stages can be eliminated by a diagnostic appraisal. Set the 'Solve It' to level 1 and press 'Mix It'. If 25 or more are correctly completed out of 30, re-set to 'Mix It' level 2. If 25 or more are correctly completed re-set to 'Mix It' level 3. If 25 or more are correct go on to 'Write It' (SM 13).




SOLVE IT

ADDITION

SM1. Add 1 or 2 digit numbers with sums less than 20.
5 consecutive 5/5 scores

SM2. Add TU to TU to give answers to HTU.
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...20 correct.

SM3. Add HTU to HTU to give answers to THTU.
* Estimate the answer to 20 calculations. Record as in L/P of Estimation Game page
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...18 correct.

SUBTRACTION

SM4. Subtract U from TU including carrying.
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...20 correct.

SM5. Subtract TU from HTU including carrying.
5 consecutive 5/5 scores
Test of 20 with teacher (paper provided)...18 correct.

SM6. Subtract HTU from THTU
* Estimate the answer to 20 calculations.
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...18 correct.

MULTIPLICATION

SM7. Multiply by units to give answers below 100.
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...20 correct.

SM8. Multiply TU by TU giving answers to THTU.
* Estimate the answer to 20 calculations.
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...18 correct.

SM9. Multiply TU by TU to give answers to THTU.
* Estimate the answer to 20 calculations.
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...18 correct.

## DIVISION

Level 1 — Line 1 | Line 1

SM10. Divide TU by U without remainders.
5 consecutive 5/5 scores.
Test of 20 with teacher (paper provided)...20 correct.

Level 2 — Line 2 | Line 2

SM11. Divide THTU by TU without remainders.
* Estimate the answer to 20 calculations
5 consecutive 5/5 scores
Test of 20 with teacher (paper provided)...18 correct.

Level 3 — Line 2 | Line 2

SM12. Divide THTU by TU without remainders.
* Estimate the answer to 20 calculations.
5 consecutive 5/5 scores.
Test with teacher (paper provided)...18 correct.

## WRITE IT

Place value to 6 figures and 3 decimal places.

Level 1

SM13. Write in figures a 3-digit number (HTU)
5 consecutive 5/5 scores.
Greater than/Less than Level 1. 5 consecutive 5/5 scores.

Level 2

SM14. Write in figures a 6-digit number (THU, THU)
5 consecutive 5/5's.
Test of 20 with teacher...20 correct.

Level 3

SM15. Write in figures a 7-digit number (M, THU,THU,T H Th-decimals to 3 places)
5 consecutive 5/5 scores.
Test of 20 with teacher...20 correct.

## GREATER THAN-LESS THAN

Activities involving
a) discrimination between two numbers including decimals
b) discrimination after calculating 2 statements in any 4 rules.
c) as (b) including decimals.

Level 1

SM16. Input or to a statement including TU.
Input or to an equation involving TU (4 rules)
5 consecutive 5/5 scores
Test 20 with teacher...20 correct

Level 2

SM17. Input or to two numbers in a statement (THTU)
Input or to an equation involving 4 rules.
5 consecutive 5/5 scores.
Test 20 with teacher...18 correct.

Level 3

SM18. Input or to two numbers (THTU) and decimals to 3 places.
Input or to a statement involving 2 different arithmetical operations.
Input or to a statement including multiplication of decimals.
5 consecutive 5/5 scores.
Test 20 with teacher...18 correct.

NUMBER STUMPER — An activity to develop logical thinking and mental manipulation of numbers. (Deductive reasoning with V.Ed content...Spearman's 'g' oriented activity)

Level 1 — SM19. Solve 5 consecutive problems.

Level 2 — SM20. Solve 8 consecutive problems.

Level 3 — SM21. Solve 8 consecutive problems.

WORD PROBLEMS.....Practice in basic arithmetic/applied arithmetic and cultivating listening skills in the language of instruction and mathematics.

A preliminary analysis of problems presented at 3 levels

Level 1

Add units to units including carrying.
Add 3 sets of units together.
Addition of tens.
Add TU to TU.
Calculate the number of tens in a 2-digit number.
Apply commutative law to the addition of units.
Apply commutative law to the multiplication of units.
Multiply units by units.
Calculate the missing factor from a multiplication sum.
Complete number sequences to HTU difficulty.
Subtract units from TU.

5 consecutive 5/5 scores after a minimum of 25 calculations. (This is to allow the machine to present a spectrum of its programme at this level)

SM22. Test 20 correct with teacher (paper provided)

Level 2

Add 3 sets of HTU together.
Addition of whole numbers and decimals to hundredths.
Calculate the number of tens in a 3-digit number.
Subtraction of hundredths.
Divide TU by U.
Complete simple equations to TU difficulty.
Complete equations to HTU difficulty.
Calculate the area of a square.
Calculate the area of a rectangle.
Calculate the perimeter of a rectangle.

SM23. 5 consecutive 5/5 scores after a minimum of 25 calculations.
Test 20 correct with teacher (paper provided)

Level 3

Addition of tenths.
Addition of hundredths.
Subtraction of tenths.
Subtraction of hundredths.
Arithmetical calculations of up to 4 items.
Calculate the product from 2 given factors.
Calculate the area of a circle, given pi and the radius.
Calculate the diameter of a circle, given the radius.
Calculate problems involving two arithmetical operations.
Calculate the perimeter of a rectangle, from l & b measurements.

Calculate %ages from given numbers.
Calculate numbers from given %ages.
Calculate the area of a triangle given b and h
Calculate the circumference of a circle given pi and the diam.
Calculate the radius of a circle from the diameter.
Divide TU by U and input the remainder.
Multiply TU by TU

SM24. 5 consecutive 5/5 scores after a minimum of 50 calculations. Test 20 correct with teacher. (paper provided)

POINTS Children will inevitably encounter problems for which they are unprepared. The list indicates to teachers the demands of a particular level as they are assessed at the time of writing. This machine has the motivating properties of speech, reinforcing correct responses, and encouraging when inaccurate inputs are received. It does not teach, but provides practice examples and reinforcement.

It has encouraged pupils to apply arithmetic and generate more positive attitudes to formulae. There is evidence of retention and recall of formulae in long-term memory by pupils using the machine for a short period. Transfer of this knowledge andits application elsewhere have yet to be investigated.

## RECORD SYSTEMS

A convenient method of recording children's progress through a programme is to print matrices corresponding to the programmes you implement, e.g.

LITTLE PROFESSOR

| + | − | x | ÷ | |
|---|---|---|---|---|
| 4 | 4 | 4 | 4 | LEVEL |
| 3 | 3 | 3 | 3 | |
| 2 | 2 | 2 | 2 | |
| 1 | 1 | 1 | 1 | |
| FUNCTION | | | | |

If located in an A/ordered lever arch file kept in the classroom; pupils can shade in their own matrix as they complete sections of the programme. If the academic year is coded in to 3 colours representing Autumn, Spring and Summer terms, then a visual record of progress and time is created.

Pupil involvement in record keeping has a positive effect on motivation, providing feedback and an intermittent positive reinforcement schedule. It reduces administrative practices for the teacher, enabling him to devote time to give individual attention to pupils with specific problems.

## GUIDANCE ON MACHINE PURCHASE AND PROGRAMME IMPLEMENTATION

### Purchasing:

1. The machines are relatively inexpensive but continual use drains batteries, causing disruption and inconvenience. Battery consumption is higher on Spelling ABC and Dataman. The new Little Professor, available in 1982, has double battery life due to a new liquid crystal display.

Mains adaptors are recommended when machines are used intensively in a resource room setting.

2. Speak and Spell machines, that have a touch sensitive keyboard, are the more recent and preferable model. Templates can be made for these to modify the upper case characters to lower case if desired.

3. Handbooks supplied with Spelling B contain the following slightly ambiguous pictures. Write the following in the white spaces next to the numbers, to minimise errors:

| | | | |
|---|---|---|---|
| No. 10 | not n | No. 87 | not stick |
| No. 15 | not t or c | No. 102 | not bag |
| No. 32 | (Americanism) | No. 122 | not tortoise |
| No. 50 | not cornet | No. 127 | not bogey |
| No. 51 | not pin | No. 136 | r |
| No. 60 | (misprint in word list) | No. 158 | c |
| No. 64 | not fox | No. 162 | not gloves |
| No. 66 | not trumpet | No. 173 | not brush |
| No. 185 | a | No. 193 | p |

4. Spelling B books are spiral bound. Remove, trim and laminate pages, punch and strengthen with plastic reinforcers and clip them into A5 ring files.

### Programme Implementation:

The critical times for implementing a programme is in setting up, and in the introduction of pupils to it. The following are suggestions

for preparation and practice which benefit both pupil and teacher:

1. Standardise the layout of work to be executed; examples are given. Acceptable handwriting and graphics should be displayed so that teacher and pupil can use them for reference.

2. Insist on strict adherence to the standard layout, (e.g. the accurate positioning of figures in columns and double underlining the date, and answers.) Everything which is not carried out to the standard, must be re-done. A tolerated mistake is a reinforcement of a bad work habit.

3. Present a pupil with a book worth having. A neatly backed exercise book on which you have perfectly written his name, sets the tone. Set out the first page for the pupil yourself in pencil (not pen until competence is acknowledged) and work through the first day's scheduled workload with him. Mark it neatly in red and add an appropriate good comment regardless of the simplicity of the activity or the pupil's age. The immediate reward of a gold star and the challenge or promise of another the next day has frequently motivated, variously labelled, fifteen year old rejectees from other systems.

Wean a pupil very gradually, e.g. one sum on his own and inspect it. If it is not up to standard, have it rubbed out and re-done. Manipulate this tutorial situation to your advantage through humour, concern, repeating the challenge or a pedantic insistence (depending on the pupil). Many "difficult" pupils delight in producing high calibre work for another teacher, to impress a significant figure. Teachers can re-direct a child's manipulative tendencies through humour to his own advantage and the pupil's success.

4. Cultivate the habit of putting what you say in writing in the child's book:

e.g. "These figures are in columns; well done!"

"Do not forget your signs."

Positive and negative recorded statements provide teachers with a record of their instruction and guidance, for parents and visitors to school. They are essential feedback to the pupil. They are cited when any action

is taken. Teachers who mark thirty/fifty books per morning need reminders to ensure that pupils do not develop bad habits or stagnate.

5. Sign work that is acceptable when completed. When pupils see that you are consistent they accept the standard the teacher creates. If the objective is more specific for a pupil with a particular problem, (e.g. "I will accept this work if all the numbers are on the line,") and it is in writing, the standard is seen to be laid down.

6. Recording the time taken when an activity is completed satisfactorily, is a variable that can be introduced from time to time, to increase productivity or re-kindle enthusiasm.

7. Encourage visitors to inspect the quality of work, e.g. Head, Head of Department, on an ad hoc and/or pre-arranged basis. This motivates pupils and teacher.

8. Contact parents by letter and inform them of improved presentation and increased competence. Send books home - (if they will return in a useable condition.) Issue a professional-looking certificate which can be criterion referenced for employers, and keep them as part of a child's Leavers' File. If parents appear to be indifferent then focus motivational ploys on the child.

Although not a panacea, these programmes and suggestion for classroom practice tend to shape the entry behaviours exhibited by many pupils in a positive direction. Where this is evident, therapeutic learning has taken place. They embody common factors in programmes that result in children in the low IQ range as well as above, achieving national norms in basic subjects within inner city areas. They are (a) small groups, (b) the presence of extra adults and aids, (c) carefully sequenced behavioural objectives, and, (d) the pupils are made aware of their progress by immediate feedback. (Rein 1981)

## BIBLIOGRAPHY AND LIST OF RECOMMENDED BOOKS


"School Learning" - Ausubel & Robinson - Holt, Reinhart & Winston 1973

"Education of Disturbed Pupils" - Wilson & Evans - Schools Council Working Paper 65

"Stating Objectives for Classroom Instruction" - Gronlund - Collier-McMillan 1978

"Educational Technology in Curriculum Development - Rowntree - Harper & Rowe 1979

"Making Schools More Effective" - Rein - Academic Press 1981

"Preventing Classroom Failure" - Ainscow & Tweddle

"Ten Good Schools: A Secondary Survey" - DES/HMSO 1979

"The School Curriculum" - DES/HMSO - 1981

"Essentials in Teaching and Testing Spelling" - Schonell - McMillan 1977

"Yes They Can - A Practical Guide for Teaching the Adolescent Slower Learner" - Open University Press 1978

"Nelson Handwriting: Primary Teachers' Manual" - Inglis & McIntosh 1979

"Schools Council 5 - 13 Objectives" - McDonald Educational

"Alpha to Omega" - Hornsby & Shear - Heinemann Educational 1978

"The Literacy Schedule" - Joan Dean, Centre for the Teaching of Reading - University of Reading

"Remedial Teachers Handbook" - P. Westwood - Oliver and Boyd 1978

"Speech in Practice" - C. Burniston - English Speaking Board 1975

"Teach Them to Speak" - Schiack - Ward Lock 1978

"Mathematics 5 - 11: A Handbook of Suggestions" - DES/HMSO 1980

"Topic Index of Mathematics Books for Less Gifted Children " - Lumb & Brown - Newcastle upon Tyne Advisory Service

"A Teachers Guide to Tests and Testing" - S. Jackson - Longman 1977

"Get Reading Right" - S. Jackson - Robert Gibson

"Richmond Test of Basic Skills" - Nelson/NFER 1978

"Norman France Profile of Mathematical Skills" - Nelson/NFER 1979

"Yardsticks" - Nelson/NFER 1978

"A Classroom Index of Phonic Resources" - Herbert & Davies Jones - National Association for Remedial Ed.

"An A - Z of Reading & Subject Books" - National Association for Remedial Ed.

"Identification of Learning Difficulties" - Nat. Association for Remedial Ed.

"The English Colour Code: Wordlist" - D.V. Moseley, Dept. of Education and Clinical Psychology, University of Newcastle upon Tyne

References:

Furrowfield School Policy Document 1981

The Furrowfield School Teaching Model in this Booklet was Synthesised from: "School Learning" - Ausubel & Robinson

"Educational Technology in Curriculum Development" - Rowntree

Middleton-St.-George College of Education Psychology Department Student Notes, written by M.H. Lee.